N. ERECTION

1. SURVEYS: CONTRACTOR SHALL EMPLOY A REGISTERED PROFESSIONAL ENGINEER OR PROFESSIONAL SURVEYOR EXPERIENCED IN SURVEYING STEEL BUILDING FRAMEWORKS. CONTRACTOR SHALL ORGANIZE STRUCTURAL STEEL SURVEYING PROCEDURES AND RECORDS TO DEMONSTRATE THE DEGREE OF CONFORMANCE OF THE STEELWORK TO TOLERANCES APPLICABLE TO PLUMB, LEVEL, HORIZONTAL ALIGNMENT AND ALLOWABLE DISPLACEMENT FROM THEORETICAL ELEVATION. CONTRACTOR SHALL REPORT ALL DISCREPANCIES. CONTRACTOR SHALL NOT PROCEED WITH EACH ERECTION STEP UNTIL APPROPRIATE ACCEPTABLE CORRECTIONS HAVE BEEN MADE, OR UNTIL COMPENSATING ADJUSTMENTS TO THE STRUCTURAL STEELWORK HAVE BEEN ACCEPTED. CONTRACTOR'S SURVEYS FOR STEELWORK SHALL:

a) ESTABLISH PERMANENT BENCH MARKS AS SHOWN AND AS NECESSARY FOR THE ACCURATE ERECTION OF STRUCTURAL STEEL;

b) ASSURE THAT ELEVATIONS OF BEARING SURFACES, AND LOCATIONS OF ANCHOR DEVICES ARE CHECKED BY ACCURATE SURVEYING BEFORE ERECTION WORK PROCEEDS; AND

c) PROVIDE SURVEY DATA DURING THE COURSE OF THE WORK AND A FINAL SURVEY SHOWING THE E-W, N-S AND ELEVATION POSITION OF THE WORK POINTS OF EACH STEEL FRAME, COLUMN AND OTHER MAJOR MEMBER AS COMPARED TO THEORETICAL LOCATION.

3. TAKE SURVEYS AND MEASURE TOLERANCES AND PLUMBNESS AT 68°F (20°C) OR SHOW CORRECTIONS TO SURVEYS WHERE TEMPERATURE IS EITHER HIGHER OR LOWER.

2. ANCHOR BOLTS AND OTHER CONNECTORS: FURNISH ANCHOR BOLTS, EMBEDDED PLATES AND OTHER CONNECTION MATERIALS WHICH MUST BE EMBEDDED INTO CONCRETE WORK. DELIVER TO THE CONSTRUCTION SITE ON-TIME AND COMPLETE WITH TEMPLATES AND PLACING DRAWINGS. TIGHTEN NUTS IN A MANNER CONSISTENT WITH THE INTENT AND THE METALLURGY OF THE BOLT MATERIAL.

a) UNLESS OTHERWISE PROVIDED, FOR BOLTS DESIGNATED AS A325, A490 OR DIWIDAG THREADBARS, TIGHTEN 1/4 TURN PAST SNUG TIGHT.

3. BASE PLATES, AND BEARING PLATES: FURNISH AND PLACE BASE PLATES AND BEARING PLATES ACCURATELY, SECURELY SHIM, LEVEL AND ALIGN. BE RESPONSIBLE FOR MAINTAINING STEEL IN PROPER POSITION THROUGH COMPLETION OF GROUTING AND UNTIL GROUT HAS ACHIEVED FULL STRENGTH. DO NOT ALLOW GROUTING UNTIL BEAMS, GIRDERS AND SO FORTH ARE PERMANENTLY ATTACHED TO COLUMN.

4. GUYING AND BRACING: THE STRUCTURAL SYSTEM MAY REQUIRE TEMPORARY BRACING IN ADDITION TO MEMBERS SHOWN IN THE CONTRACT DRAWINGS IN ORDER TO RESIST SAFELY ALL IMPOSED LOADS DURING CONSTRUCTION AND TO MAINTAIN CORRECT ALIGNMENT. PROVIDE TEMPORARY GUYING, BRACING AND CONNECTING MEMBERS WHERE NEEDED TO RESIST SAFELY ALL POSSIBLE COMBINATIONS OF CONSTRUCTION AND ERECTION LOADS INCLUDING DEAD LOADS, ERECTION LOADS, WIND AND OTHER LATERAL LOADS AND SUPERIMPOSED CONSTRUCTION LOADS, BOTH HORIZONTAL AND VERTICAL. REMOVE TEMPORARY MEMBERS AND CONNECTIONS AFTER PERMANENT MEMBERS ARE IN PLACE. FINAL CONNECTIONS ARE MADE AND CONCRETE HAS ACHIEVED DESIGN STRENGTH.

5. BOLT TENSIONING: ASTM A325 AND A490 BOLTS SHALL BE INSTALLED USING ONE OF THE FOLLOWING SYSTEMS:

a) TENSION CONTROLLED FASTENERS WITH SPLINED TWIST-OFF HUBS (TCF) SHALL BE INSTALLED IN ACCORD WITH *AISC SPECIFICATION* REQUIREMENTS AND WITH APPLICABLE PRINTED INSTRUCTIONS AND RECOMMENDATIONS PROVIDED BY THE FASTENER MANUFACTURER AND TENSIONING SYSTEM SUPPLIER. TO PROVIDE UNIFORM AND FULL TENSIONING IN BOLTS-BOLT JOINTS, BOLTS SHALL BE TIGHTENED IN STAGES TO ASSURE UNIFORM CONTACT BETWEEN FAYING SURFACES AND SNUG-TIGHT CONDITION AT ALL POINTS WITHIN EACH JOINT PRIOR TO FINAL TENSIONING AND SHEARING OF THE SPLINE.

i) CONTRACTOR SHALL CHECK EACH TCF BOLT AFTER TENSIONING TO VERIFY THAT THE SHEARED SURFACE DOES NOT DISPLAY ANY ABNORMALITY. BOLTS DISPLAYING AN ABNORMALITY SHALL BE REMOVED AND REPLACED.

b) BOLTS ONE INCH (25 MM) IN DIAMETER AND LARGER AND ALL ASTM A490 BOLTS SHALL BE TENSIONED UTILIZING DIRECT-TENSION INDICATING WASHERS (DTI) IN STRICT ACCORD WITH ASTM F959. UNDER NO CIRCUMSTANCE MAY A DTI BE REUSED. DTI WASHERS SHALL NOT BE USED DIRECTLY OVER SLOTTED OR OVERSIZED HOLES BUT SHALL BE USED IN ADDITION TO ALL SPECIAL WASHERS REQUIRED AT SLOTTED OR OVERSIZE HOLES. TENSIONING METHODS, NUMBER, THICKNESS AND TYPE OF WASHERS, PROCEDURE AND MEASUREMENTS SHALL BE IN STRICT ACCORD WITH THE MANUFACTURER'S LATEST PRINTED INSTRUCTIONS AND RECOMMENDATIONS.

i) CONTRACTOR SHALL VERIFY CORRECT TENSION BY MEASURING THE AVERAGE RESIDUAL GAP BETWEEN THE BOLT HEAD OR NUT AND THE DTI IN STRICT ACCORD WITH ASTM F959. TORQUE WRENCHES OR CALIBRATED WRENCHES SHALL NOT BE USED TO INSPECT OR TO VERIFY THE TENSION.

ii) FOR BOLTS EXPOSED TO THE WEATHER, GAPS IN TYPE 325 DTI SHALL BE REDUCED TO LESS THAN 0.005 INCHES (130 µM) FOR NOT LESS THAN HALF OF THE PERIMETER OF THE DTI. PROVIDE ADDITIONAL GAP REDUCTION WHERE REQUIRED TO ENSURE WATER INTRUSION.

c) FILLER BEAMS MAY, AT CONTRACTOR'S OPTION, BE CONNECTED WITHOUT MAKING USE OF A TENSION CONTROL DEVICE BUT, IF SO, SHALL BE TENSIONED BY THE TURN-OF-THE-NUT TECHNIQUE. FILLER BEAMS DO NOT FRAME TO, OR FRAME IMMEDIATELY ADJACENT TO COLUMNS, DO NOT FRAME TO GIRDERS CARRYING COLUMNS, POSTS OR HANGERS (EXCEPT STAIR LANDING HANGERS), AND DO NOT FRAME TO TRUSSES.

d) EXCEPT WHERE SPECIFICALLY WAIVED IN THE STRUCTURAL DRAWINGS, ALL A325 AND A490 BOLTS, WHETHER OR NOT USED IN BEARING-TYPE CONNECTIONS, SHALL BE FULLY TENSIONED. THIS REQUIREMENT SHALL BE MAINTAINED WHETHER OR NOT REQUIRED BY *AISC SPECIFICATION*.

6. BOLTING REQUIREMENTS: CONTRACTOR SHALL PAY STRICT ATTENTION TO THE APPLICABLE CODES AND STANDARDS TO THE REQUIREMENTS OF THIS SPECIFICATION AND TO THE FOLLOWING GENERAL REQUIREMENTS:

a) IMPACT WRENCHES USED FOR TIGHTENING ASTM A325 AND ASTM A490 BOLTS SHALL BE IN SUFFICIENTLY GOOD REPAIR TO DEPENDABLY DELIVER THE MANUFACTURER'S FULL RATED TORQUE. AIR COMPRESSOR(S) USED TO POWER IMPACT WRENCHES SHALL BE IN GOOD REPAIR AND SHALL BE CAPABLE OF DELIVERING ADEQUATE AIR PRESSURE AND VOLUME SO THAT FULL RATED PERFORMANCE IS ACHIEVED FROM EACH WRENCH AT THE POINT OF BOLTING. AIR HOSES AND COUPLINGS SHALL BE NON-LEAKING. THE IMPACT WRENCH(ES) SELECTED SHALL TIGHTEN THE BOLTS TO NOT LESS THAN THE MINIMUM SPECIFIED TENSION IN TEN SECONDS OR LESS.

i) FOR BOLT SIZES EQUAL TO OR LARGER THAN 1 IN. (25 MM) A325 AND 7/8 IN. (22 MM) A490, PROVIDE IMPACT WRENCHES EQUIVALENT TO OR LARGER IN CAPACITY THAN A CHICAGO PNEUMATIC 6120, WITH AIR PRESSURE AT THE WRENCH NOT LESS THAN 100 PSI (700 KPA).

b) WASHERS: A HARDENED WASHER SHALL BE INSTALLED ADJACENT TO THE BEARING FACE OF THE TURNED ELEMENT (NUT OR BOLT HEAD) OF EACH ASTM A325 OR ASTM A490 BOLT ASSEMBLY. A 5/16 INCH (8 MM) THICK WASHER OR THICKER, OTHERWISE CONFORMING TO ASTM F436, SHALL BE USED AT BOTH ENDS OF 1-1/8 (28 MM) INCH AND 1-1/4 (32 MM) INCH DIAMETER A490 BOLTS CONNECTING MATERIAL WITH STANDARD SIZE HOLES WHERE MATERIAL IS 5/8 INCH (16 MM) OR LESS IN THICKNESS.

c) LONG SLOTTED HOLES, WHERE ACCEPTED, AND WHERE ON AN OUTSIDE PLY, SHALL BE COVERED COMPLETELY BY 5/16 INCH (8 MM) HARDENED WASHERS; ALTERNATIVELY, EITHER PLATE WASHERS OR CONTINUOUS BARS OF AT LEAST 3/8 INCH (10 MM) THICKNESS AND MINIMUM YIELD POINT OF FY = 50 KSI (345 MPA) MAY BE USED. HOLES IN PLATE WASHERS OR BARS SHALL BE STANDARD SIZE. REGULAR HARDENED WASHERS ARE REQUIRED IN ADDITION TO PLATE WASHERS OR BARS.

d) SHORT SLOTTED AND OVERSIZED HOLES, WHERE ACCEPTED, AND WHERE ON AN OUTSIDE PLY, SHALL BE COVERED BY HARDENED WASHERS, PLATE WASHERS OR CONTINUOUS BARS AS PROVIDED FOR LONG SLOTTED HOLES.

e) BOLTS AND NUTS, AT TIME OF TIGHTENING, SHALL BE CLEAN, RUST-FREE, FREE FROM THREAD DAMAGE, AND SHALL RETAIN NOT LESS THAN THE LIGHT RESIDUAL COATING OF OIL AS RECEIVED FROM THE FACTORY. THREAD LUBRICANTS SHALL BE APPLIED TO ALL ASTM A490 BOLTS OR NUTS, TO ALL 1 IN. (25 MM) AND LARGER ASTM A325 BOLTS AND TO ALL BOLTS AND NUTS THAT DISPLAY ANY SIGN OF LOSS OF RESIDUAL OIL, RUST OR OTHER CONTAMINANT. WHERE GALVANIZED NUTS ARE NOT WAX-DIPPED BY MANUFACTURER, APPLY THREAD LUBRICANT.

i) LUBRICATION SHALL BE COMPLETED PRIOR TO ASSEMBLY AND PRIOR TO BOLTS BEING SENT UP INTO THE STEEL FRAME.

ii) IN THE EVENT OF A DISPUTE REGARDING TIGHTNESS OF BOLTS INSTALLED IN THE FIELD, CLEANLINESS AND LUBRICATION OF BOLTS AND NUTS USED FOR VERIFICATION TESTS SHALL BE SPECIFICALLY REPRESENTATIVE OF FIELD MATERIALS AND CONDITIONS.

f) TIGHTENING PROCEDURES: DURING TIGHTENING, TO THE FULL EXTENT PRACTICAL, THE UNTURNED BOLT ELEMENT SHALL BE HELD WITHOUT ROTATION. ALL PLIES SHALL FIRST BE BROUGHT INTO FULL CONTACT BY PARTIALLY TENSIONING ALL OF THE BOLTS. TENSIONING SHALL COMMENCE FROM THE MOST RIGID PART OF THE CONNECTION, MOVING TO THE FREE EDGES.

g) RETIGHTENING: ASTM A490 BOLTS AND GALVANIZED ASTM A325 AND A490 BOLTS, ONCE COMPLETELY OR PARTIALLY TORQUED, SHALL NOT BE REUSED. ASTM A325 BOLTS MAY BE REUSED ONLY WITH SPECIFIC WRITTEN ACCEPTANCE.

h) LENGTH: BOLTS SHALL NOT PROJECT BEYOND THE FACE OF THE NUT BY MORE THAN 0.25 INCHES (6 MM), SMALLER WHERE REQUIRED TO ACHIEVE CLEARANCE.

7. UNFAIR HOLES SHALL NOT BE ENLARGED BY BURNING OR DRIFTING ALONE. ENLARGE HOLES WHERE NECESSARY AND PERMITTED BY FLAME PIERCING AND REAMING OR BY REAMING ALONE OR BY OTHER ACCEPTED MEANS. HOLES AFTER ENLARGEMENT SHALL BE TRUE ROUND HOLES NORMAL TO THE SURFACES JOINED. INCREASE BOLT SIZE TO FILL ENLARGED AND REAMED HOLES.

8. SPLICES: COLUMN SPLICES AND OTHER COMPRESSION JOINTS THAT DEPEND UPON CONTACT BEARING AFTER ALIGNMENT SHALL CONFORM WITH THE FOLLOWING:

a) BEARING SURFACES SHALL BE CLEANED BEFORE THE PARTS ARE ASSEMBLED.

b) FASTENING OF COMPRESSION SPLICES AND JOINTS SHALL BE PERFORMED AFTER THE ABUTTING SURFACES HAVE BEEN BROUGHT UNIFORMLY INTO CONTACT.

c) AN AREA OF NOT LESS THAN 65% OF THE CONTACT AREA SHALL BE IN UNIFORM BEARING, WHERE:

i) CONTACT AREA IS THE GROSS AREA OF THE SMALLER PIECE JOINED, WITHOUT DEDUCT FOR WELD BEVELS AND THE LIKE.

ii) AREA OF UNIFORM BEARING IS THAT PORTION OF THE CONTACT AREA WHICH IS SEPARATED BY NOT MORE THAN 0.02 INCHES (500 µM) FROM THE LARGER PIECE JOINED. NOTE THAT THE TOTAL AREA OF SURFACE JOINED BY WELDING IS INCLUDED. AT CONTRACTOR'S OPTION, THE AREA OF UNIFORM BEARING MAY BE INCREASED TO CORRECT FIT-UP DEFICIENCIES BY EITHER:

A. INCREASING THE WELD SURFACE AREA; OR

B. PACKING WITH STAINLESS STEEL SHIMS, 0.02 INCHES (500 µM) OR THINNER IN THICKNESS.

d) THE AREA OF UNIFORM BEARING SHALL BE LOCATED SYMMETRICALLY ABOUT BOTH OF THE SYMMETRICAL AXES OF THE SMALLER PIECE JOINED. TO ACHIEVE THIS REQUIREMENT, ANY PART OF THE AREA OF UNIFORM BEARING MAY BE NEGLECTED, PROVIDED THAT THE REMAINING AREA IS NOT LESS THAN 65% OF THE CONTACT AREA.

e) OUTSIDE OF THE AREA OF UNIFORM BEARING, SEPARATIONS GREATER THAN 0.03 INCHES (750 µM) SHALL BE CORRECTED BY SHIMMING.

9. FINGER TIGHT: BOLTS DESIGNATED AS "FINGER TIGHT" SHALL BE TENSIONED TO 60 INCH-POUNDS (6 N·M) WITH THE GOALS OF BRINGING THE PARTS FIRMLY TOGETHER WHILE ALLOWING FOR A SLIDING CONNECTION. PROVIDE DOUBLE NUTS AT ALL SUCH LOCATIONS. PROVIDE NOT LESS THAN TWO FULL CYCLES OF [illegible] PROPERLY TENSIONED.

10. SHIMS, WHERE REQUIRED TO CORRECT FIT-UP OF WORK, SHALL BE OF STAINLESS STEEL.

11. RUNOFF AND RUNON TABS SHALL BE PROVIDED AT THE ENDS OF ALL SENSITIVE BUTT WELDS AND BOTH TABS AND ERECTION AIDS SHALL BE REMOVED AT ALL LOCATIONS WHERE THEY INTERFERE WITH THE WORK OF OTHER TRADES, AND AT ALL LOCATIONS DESIGNATED. RUNOFF TABS SHALL BE NOT LESS THAN 1-1/4 INCHES (30 MM) IN LENGTH.

12. DRILLED-IN ANCHORS SHALL BE INSTALLED IN STRICT ACCORD WITH MANUFACTURER'S PRINTED INSTRUCTION. SET PERPENDICULAR TO CONCRETE SURFACE. ANCHORS MAY BE PLACED IN BLOCK OR BRICK WORK ONLY WHERE VOIDS WITHIN 9 INCHES (230 MM) OF THE ANCHOR HAVE BEEN FILLED SOLIDLY WITH GROUT. DRILLED HOLES SHALL BE CLEANED THOROUGHLY BY COMPRESSED AIR OR WATER JET. HOLES IN STRUCTURAL STEEL, INTENDED TO FIT OVER DRILLED-IN ANCHORS, SHALL BE 1/16TH INCH (1500 µM) LARGER THAN THE NOMINAL DIAMETER OF THE BOLT EXCEPT WHERE LARGER OR SMALLER HOLES ARE STIPULATED IN THE CONTRACT DRAWINGS. PROVIDE STANDARD PLATE WASHER.

13. LOCK NUTS, DOUBLE NUTS OR THREAD LOCKING COMPOUND SHALL BE USED ON ALL NUTS NOT TENSIONED IN ACCORD WITH THE SPECIFICATIONS FOR A325 OR A490 BOLTS AND ON ALL A307 BOLTS. PROVIDE THREAD LOCKING COMPOUND ON A325 AND A490 BOLTS ONLY WHERE ALLOWED SPECIFICALLY IN THE CONTRACT DRAWINGS; AT OTHER LOCATIONS, USE DOUBLE NUTS OR LOCKING NUTS AS SPECIFIED HEREIN.

M. CLEANING, PAINTING AND GALVANIZING

1. GENERAL: STEEL WORK SHALL BE CLEANED, PAINTED OR GALVANIZED AS PROVIDED HEREIN. BASIC WORK SHALL BE DONE IN THE SHOP, WITH FIELD TOUCH-UP, ONLY, DONE IN THE FIELD.

2. CORROSION PROTECTION: THIS SPECIFICATION CONTEMPLATES 6 LEVELS OF CORROSION PROTECTION:

a) FIREPROOFED/UNPAINTED: STEEL WORK SHALL BE SHOP CLEANED TO MEET THE REQUIREMENTS OF SSPC-SP3. ADDITIONAL CLEANING SHALL BE ACCOMPLISHED IN THE FIELD TO ALLOW PROPER ADHERENCE OF SPRAY FIREPROOFING.

b) FIREPROOFED/SHOP PRIMED: PROVIDE AS FOR FIREPROOFED/UNPAINTED, BUT PAINT WITH SHOP PRIMER WITH FIELD TOUCH-UP, NOT LESS THAN 2.0 NOR MORE THAN 4.0 DRY FILM THICKNESS (50 µM/100 µM). PROVIDE ONLY WHERE SHOWN SPECIFICALLY IN THE CONTRACT DRAWINGS.

c) SHOP PRIMER: PROVIDE AS FOR FIREPROOFED/SHOP PRIMED.

d) EXPOSED TO AMBIENT TEMPERATURE: STEEL WHICH IS ENCLOSED, CONCRETE-ENCASED OR FIREPROOFED, BUT WHICH IS NOT PROTECTED FROM CHANGES IN AMBIENT TEMPERATURE, SHALL BE CLEANED TO MEET THE REQUIREMENTS OF SSPC-SP6 BEFORE PAINTING WITH A ZINC-RICH PRIMER WITH FIELD TOUCH-UP, NOT LESS THAN 2.0 NOR MORE THAN 3.5 DRY FILM THICKNESS (50 µM/90 µM).

i) PROVIDE GALVANIZED BOLTS, NUTS, WASHERS, DTI'S AND INSERTS, AS APPLICABLE, FOR THE BOLTING OF MEMBERS EXPOSED TO AMBIENT TEMPERATURES.

ii) MEMBERS EXPOSED TO AMBIENT TEMPERATURES SHALL BE FULLY PAINTED. NO-PAINT AREAS ARE NOT PERMITTED.

e) EXPOSED TO WEATHER: STEEL WHICH IS EXPOSED TO THE WEATHER INCLUDING EXTERIOR LINTELS (EXCEPT WHERE STAINLESS IS REQUIRED) SHALL BE HOT-DIPPED GALVANIZED. TOUCH-UP AT WELDS AND AT DAMAGED SURFACES AFTER FIRST CLEANING TO SSPC-SP3, WITH SLAG AND WELD SPATTER REMOVED FROM ALL AREAS. PAINT GALVANIZED STEEL WHERE SHOWN IN THE CONTRACT DRAWINGS.

i) PROVIDE GALVANIZED BOLTS, NUTS, WASHERS, DTI'S, AND INSERTS, AS APPLICABLE, FOR THE BOLTING OF GALVANIZED MEMBERS.

3. PAINT SHALL BE APPLIED ONLY TO DRY SURFACES, ONLY AT TIMES WHEN STEEL SURFACE TEMPERATURES ARE ABOVE THE DEW POINT, AND SHALL BE APPLIED THOROUGHLY AND EVENLY WITHOUT SAGS OR HOLIDAYS. PAINT SHALL BE APPLIED BY SUITABLE SPRAY EQUIPMENT IN STRICT ACCORD WITH THE PAINT MANUFACTURER'S PRINTED INSTRUCTIONS. PROVIDE A DRY FILM THICKNESS WITHIN THE RANGE SPECIFIED HEREIN, INCLUDING AROUND OUTSIDE CORNERS OR OTHER ABRUPT CHANGES IN SURFACE PROFILE.

4. FIELD TOUCH-UP SHALL BE PROVIDED TO FIELD BOLTS OF PAINTED AND OF GALVANIZED COMPONENTS AND TO ALL POINTS OF DAMAGE, INCLUDING AREAS RECEIVING WELD AFTER COATING

a) UNPAINTED SURFACES SHALL BE RECLEANED TO THE EXTENT NECESSARY TO ACHIEVE SOUND TIGHT BOND OF OTHER WORK.

b) PAINTED SURFACES SHALL BE CLEANED AND PAINTED TO THE STANDARDS OF THE SHOP COATING AND TOUCH-UP SO AS TO PROVIDE FOR NONDAMLIKE SURFACES AND FOR TIGHT BOND OF OTHER WORK.

c) GALVANIZED SURFACES SHALL BE CLEANED OF SLAG AND BURNED METAL BY VIGOROUS WIRE BRUSHING AND OTHER TOOLS, TO PRODUCE SHINY METAL, FREE FROM LOOSE PARTICLES. FINISH CLEAN BY SOLVENTS IN ACCORD WITH SSPC-SP1. FIELD-APPLY GALVANIZING TOUCH-UP TO ACHIEVE QUALITY OF THE ORIGINAL AND UNDAMAGED SHOP COATING.

d) COAT NO-PAINT AREAS AFTER COMPLETION OF ERECTION.

5. CONTACT WITH ALUMINUM: SURFACES WHICH WILL BE IN CONTACT WITH ALUMINUM SHALL RECEIVE TWO COATS OF ALUMINUM PASTE VARNISH OVER A SHOP-PRIMED SURFACE

IV. REINFORCED CONCRETE

A. SEE ARCHITECTURAL DRAWINGS FOR EXACT DETAIL AND LOCATION OF CURBS, OPENINGS OR RECESSES IN SLABS AND FOR OTHER DIMENSIONS NOT SHOWN IN STRUCTURAL DRAWINGS.

SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR INFORMATION REGARDING SIZE AND LOCATION OF OPENINGS FOR DUCTS, PIPES, CONDUITS AND THE LIKE, FOR MACHINE PADS, ETC.

OPENINGS OR RECESSES IN THE STRUCTURE WHICH ARE NOT SHOWN IN THE STRUCTURAL DRAWINGS, EITHER DIRECTLY OR BY TYPICAL DETAIL, SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

B. NORMAL WEIGHT CONCRETE MIXTURES SHALL BE READY-MIXED CONCRETE 28-DAY COMPRESSIVE STRENGTH, F'C = 4,000 PSI AND WITH A DRY UNIT WEIGHT OF 145 PCF UNLESS OTHERWISE NOTED. LIGHTWEIGHT CONCRETE MIXTURES SHALL BE READY-MIXED CONCRETE 28-DAY COMPRESSIVE STRENGTH, F'C = 4,000 PSI. READY-MIXED CONCRETE SHALL BE SUPPLIED BY A NEW YORK CITY CERTIFIED BATCH PLANT.

LIGHTWEIGHT CONCRETE SHALL PROVIDE AN AIR-DRY UNIT WEIGHT OF NOT LESS THAN 110 PCF (1760 KG/CUBIC METER) NOR MORE THAN 115 PCF (1840 KG/CUBIC METER), MEASURED IN ACCORD WITH ASTM C567, AND SHALL HAVE A MAXIMUM FRESH UNIT WEIGHT OF 120 PCF (1870 KG/CUBIC METER). ALL MEASUREMENTS SHALL BE TAKEN AT POINTS OF DISCHARGE INTO THE WORK.

LIGHTWEIGHT COARSE AGGREGATE SHALL BE A ROTARY KILN PRODUCT OF EXPANDED SHALE OR SLATE, CONFORMING TO ANSI/ASTM C330, ASTM GRADE SIZE #67 (19 TO 4.8 MM) OR ASTM GRADE SIZE #8 (9.5 TO 2.4 MM).

HAND-MIXED CONCRETE SHALL BE USED ONLY WHERE SPECIFICALLY ACCEPTED BY ENGINEER. SUCH CONCRETE SHALL BE MIXED ONLY IN WATERTIGHT CONTAINERS WITH DRY MATERIALS MEASURED BY LOOSE VOLUME. SAND AND CEMENT MIXED TOGETHER DRY PRIOR TO ADDING COARSE AGGREGATE. WATER, WHEN ADDED, SHALL BE APPLIED SLOWLY WITH THE ENTIRE MASS TURNED TO PROVIDE FOR AN EVEN MIXTURE AT ALL TIMES.

C. UNLESS OTHERWISE NOTED: ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.

D. MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCEMENT (SUBJECT TO TOLERANCES PERMITTED BY CODE) IN ACCORDANCE WITH ACI 318, UNLESS OTHERWISE INDICATED.

E. SPLICING OF WWF, AT ALL SPLICED EDGES SHALL BE SUCH THAT THE OVERLAP MEASURED BETWEEN OUTERMOST CROSS WIRES OF EACH FABRIC SHEET IS NOT LESS THAN THE SPACING OF THE CROSS WIRE PLUS 2 INCHES, NOR LESS THAN 8 INCHES.

F. CAST NEW CONCRETE AS REQUIRED TO REPAIR CONCRETE SLABS, BEAM ENCASEMENTS, AND THE LIKE THAT HAD BEEN DAMAGED OR REMOVED IN THE EXECUTION OF THIS CONTRACT.

1. FILL WITH NON-SHRINK GROUT ALL ABANDONED SLAB OPENINGS

G. REINFORCING STEEL DESIGNATED TO REMAIN FOLLOWING THE DEMOLITION AND CONCRETE REMOVAL OPERATIONS SHALL BE REPAIRED IF DAMAGED IN THE COURSE OF THE WORK. SUBMIT REPAIR PROCEDURES FOR ACCEPTANCE BY THE ENGINEER.

H. SPLICING OF REINFORCEMENT IS PERMITTED ONLY AT LOCATIONS SHOWN IN THE CONTRACT DRAWINGS OR AS ACCEPTED BY THE ENGINEER. UNLESS OTHERWISE SHOWN OR NOTED, REINFORCING STEEL SHALL BE SPLICED FOR ITS FULL TENSILE CAPACITY IN ACCORDANCE WITH ACI 318.

I. REINFORCING BAR DEVELOPMENT LENGTHS SHALL BE COMPUTED IN ACCORDANCE WITH ACI 318-89.

J. GROUT UNDER BASE PLATES AND BEDDING PLATES SHALL BE NON-SHRINKING TYPE.

K. HORIZONTAL CONDUITS ARE PERMITTED IN SLABS PROVIDED THAT THE SLAB THICKNESS IS AT LEAST 4" THICK, THE CONDUIT SIZE IS NOT GREATER THAN 1/3 OF THE SLAB THICKNESS (OR 1/6 OF THE SLAB THICKNESS WHERE TWO CONDUITS MEET CROSS), AND THE CONDUIT IS RUN AT MID DEPTH IN THE SLAB THICKNESS AND ARE SPACED NOT LESS THAN THREE CONDUIT DIAMETERS OR WIDTHS ON CENTER AND CAN BE ACCOMMODATED WITHOUT DISPLACING REINFORCEMENT FROM LOCATIONS PROVIDED IN THE CONTRACT DOCUMENTS. ALUMINUM CONDUIT IS PROHIBITED. CONFORM TO THE REQUIREMENTS OF ACI 318.

V. METAL DECK

A. METAL FLOOR DE[illegible] GALVANIZED STE[illegible] SQ GRADE 40, H[illegible] GALVANIZING SH[illegible] G60. FOR INST[illegible] WATERPROOF DEC[illegible] HEAVIER. PROV[illegible] LOK-FLOOR DECK [illegible] 1 1/2" DEEP TY[illegible]

B. SHEET METAL AC[illegible] QUALITY, GALVA[illegible]

C. WELDING WATERL[illegible] AWS A5.1 OR A5[illegible] TO STRUCTURAL [illegible] E7018 FOR JOIN[illegible]

D. SELF-DRILLING [illegible] MM TEKS/1 AS [illegible] TOOL WORKS. EL[illegible] ENGINEER.

E. INSTALL STEEL [illegible] MANUFACTURER'S [illegible] AS SPECIFIED H[illegible]

F. CLEANING: PRI[illegible] SHALL CLEAN SU[illegible] OIL, DEBRIS AN[illegible] INTERFERE WITH [illegible] STUD SHEAR CON[illegible] OF DECK UNITS [illegible]

G. FASTENING: PE[illegible] MEMBER BY 0.75[illegible] 12 INCHES (300[illegible] IS GIVEN IN TH[illegible] THE PROVISIONS [illegible] IN RIBS IN WHI[illegible] THAT EACH DECK [illegible] ADEQUATELY SEC[illegible] CONTACT WITH T[illegible]

H. SIDE LAPS: LO[illegible] WELDING WITH 0[illegible] EXCEEDING 36 I[illegible] FASTENERS (12-[illegible] EXCEEDING 18 I[illegible] REQUIRED TO PR[illegible] UNDER FRESH CO[illegible]

I. AT CANTILE[illegible] MORE THAN [illegible] INTERVALS [illegible]

I. OPENINGS THROUG[illegible] STRUCTURAL DRAW[illegible] REVIEW

VI. CONTROLLED INSPECT[illegible]

A. CONTROLLED INSP[illegible] FOR ALL STRUCTU[illegible] INSTALLATION OF [illegible] PLACEMENT OPERA[illegible]